

ONLINE

ELA Classroom Activity

How the Brain Works

The Classroom Activity introduces students to the context of a performance task, so they are not disadvantaged in demonstrating the skills the task intends to assess. Contextual elements include: an understanding of the setting or situation in which the task is placed, potentially unfamiliar concepts that are associated with the scenario, and **key terms** or vocabulary students will need to understand in order to meaningfully engage with and complete the performance task. The Classroom Activity is also intended to generate student interest in further exploration of the key idea(s). The Classroom Activity should be easy to implement with clear instructions.

Please read through the entire Classroom Activity before beginning the activity with students to ensure any classroom preparation can be completed in advance.

Throughout the activity it is permissible to pause and ask students if they have any questions.

Resources Needed:

- Pencil
 - Students who need an accommodation may use their preferred tool for writing.
- Paper
- Some method of displaying ancillary materials¹
- Ancillary materials (Figure 1)

Learning Goal:

- Students will understand the context of these key ideas related to the topics:
 - The brain is responsible for everything that takes place inside the body, and it is also responsible for interpreting the things that are going on outside the body as taken in by the five senses.
 - The central nervous system is responsible for a person's understanding of what is going on inside and around him/her.
 - The main parts of the brain have many different functions.

Students will understand these key terms:

- **cerebrum:** the thinking part of the brain that controls voluntary muscles and contains memory
- **cerebellum:** the part of the brain that controls balance, movement, and coordination (movement or parts working together)
- **brain stem:** the part of the brain that is responsible for the vital functions of the body and connects the brain to the spinal cord
- **pituitary gland:** the part of the brain that controls growth and releases hormones
- **spinal cord:** connects the body to the brain

¹ Facilitators can decide whether they want to display ancillary materials using an overhead projector or computer/Smartboard, or whether they want to produce them as a handout for students.

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- **voluntary muscles:** movement of these muscles is consciously controlled by the brain; i.e., leg muscles
- **involuntary muscles:** muscles that move without the brain thinking about it; i.e., heart muscles

Note: Definitions are provided here for the convenience of the facilitator. Students are expected to understand these key terms in the context of the task, not memorize the definitions.

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[**Purpose:** The facilitator's goal is to engage students and interest them in finding out what the brain does. This task will allow students to be active participants as they explore the functions of the brain in the context of the performance assessment they will complete in the coming days.]

Facilitator says: "Today, we will get ready for the How the Brain Works Performance Task. We will be learning about different parts of the brain, and what they do. First, you are going to participate in a challenge. The idea of the challenge is to see how long you can go without blinking. You may want to choose a spot on the wall that you are going to stare at, or simply stop your eyes from moving and keep them open. Once you blink, raise your hand so that I will know you have finished the challenge. When you are finished, sit quietly so that you do not distract the students around you. After I count down from 5, the challenge will begin. Five, four, three, two, one, begin."

[Allow 1-2 minutes for the challenge. Find out who had the longest time.]

Facilitator says: "Why do we blink even when we are trying not to? Why do we breathe without having to think about it? How do we know if the water in the tub is too hot or too cold? How do we know we are being called for dinner? Turn and talk to the person sitting beside you about the answer to these questions."

[Lead the students to the understanding that our nervous system is responsible for these things. Hand out a piece of paper to each student.]

Facilitator says: "Our brain is the 'CEO' or 'boss' of this system (and all other systems in our body). On the sheet of paper I gave you, write a list of at least 5 things that our brains do."

[Have students share their answers with the class. Possible answers include: run, jump, talk, solve math problems, read, hear, breathe, blink, swallow, stand, grow, remember things, etc.]

[Facilitator displays **Figure 1: The Brain**. Note: For students who are visually impaired, read the description of the diagram.]

Facilitator says: "As we discuss the different parts of the brain, write down the name of the part of the brain that you think would be responsible for each action on the list that you have created."

Our brain includes:

1. the cerebrum (suh-REE-brum)

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2. the cerebellum (sair-uh-BELL-um)
3. the brain stem
4. the pituitary gland (puh-TOO-uh-ter-ee gland)
5. the spinal cord

The cerebrum is located at the front of the brain. This is the thinking part of the brain. It helps control the voluntary muscles—the ones that move when you want them to move. This part of the brain also contains your memory and it helps you to reason. For example, you reason, if I do my homework now, I will be allowed to play my favorite game later.

The cerebellum is located at the back of the brain. This part of the brain controls balance, movement, and coordination. Everyone try to pat your head and rub your stomach at the same time.”

[Pause for a minute or two while students try this.]

Facilitator says: “Your cerebellum has to work very hard to coordinate your hands so that you are able to do two different movements at the same time. ‘The brain stem is located at the bottom of your brain. This part of the brain is small but responsible for basic vital functions of the body. It connects your brain to your spinal cord. Where is your spinal cord?’”

[Lead students to the understanding that the spinal cord is in the middle of the back, and goes from your head to your waist.]

Facilitator says: “Your brain stem is in charge of all of the basic actions that need to happen for your body to function. What would some of those actions be?”

Possible student responses (*unscripted*):

- breathing air
- digesting food
- circulating blood

Facilitator says: “The brain stem helps control the involuntary muscles in your body. Involuntary muscles are the muscles that do what they need to do without the person thinking about it. The brain stem tells your heart to pump faster when you are exercising, and it tells your stomach to digest your meals.

The pituitary gland is located in the middle of the brain behind the nose. The pituitary gland controls your growth. It produces and releases hormones into your body to make you grow.

How do you think a message gets from your brain to your toes or from your toes to your brain?”

[Lead students to the understanding that it is nerves that transport these messages.]

Facilitator says: “In your small groups, share the list of actions that you wrote down, and the part of the brain that you think is responsible for this action.”

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[Allow students 5 minutes to discuss their ideas.]

Facilitator says: “Inside your body is a very complicated highway system of tiny nerves that connect all the parts of your body to your brain so that messages can get back and forth.

Obviously your brain is very important. What are some things that you can do to keep your brain strong and healthy?”

Possible student responses (*unscripted*):

1. Eat healthy foods.
2. Get lots of exercise.
3. Wear a helmet when doing activities where you could hit your head.
4. Exercise and use your brain by doing challenging activities such as puzzles, reading books, playing musical instruments, making art, and having conversations.
5. Get an appropriate amount of sleep so that your brain has a chance to organize all the information it has taken in and then rest, etc.]

Facilitator says: “In your performance task, you will be learning about what the brain does. The information that we talked about today should help prepare you for the research and writing you will do in the performance task.”

Note: Ancillary materials are located on the next page.

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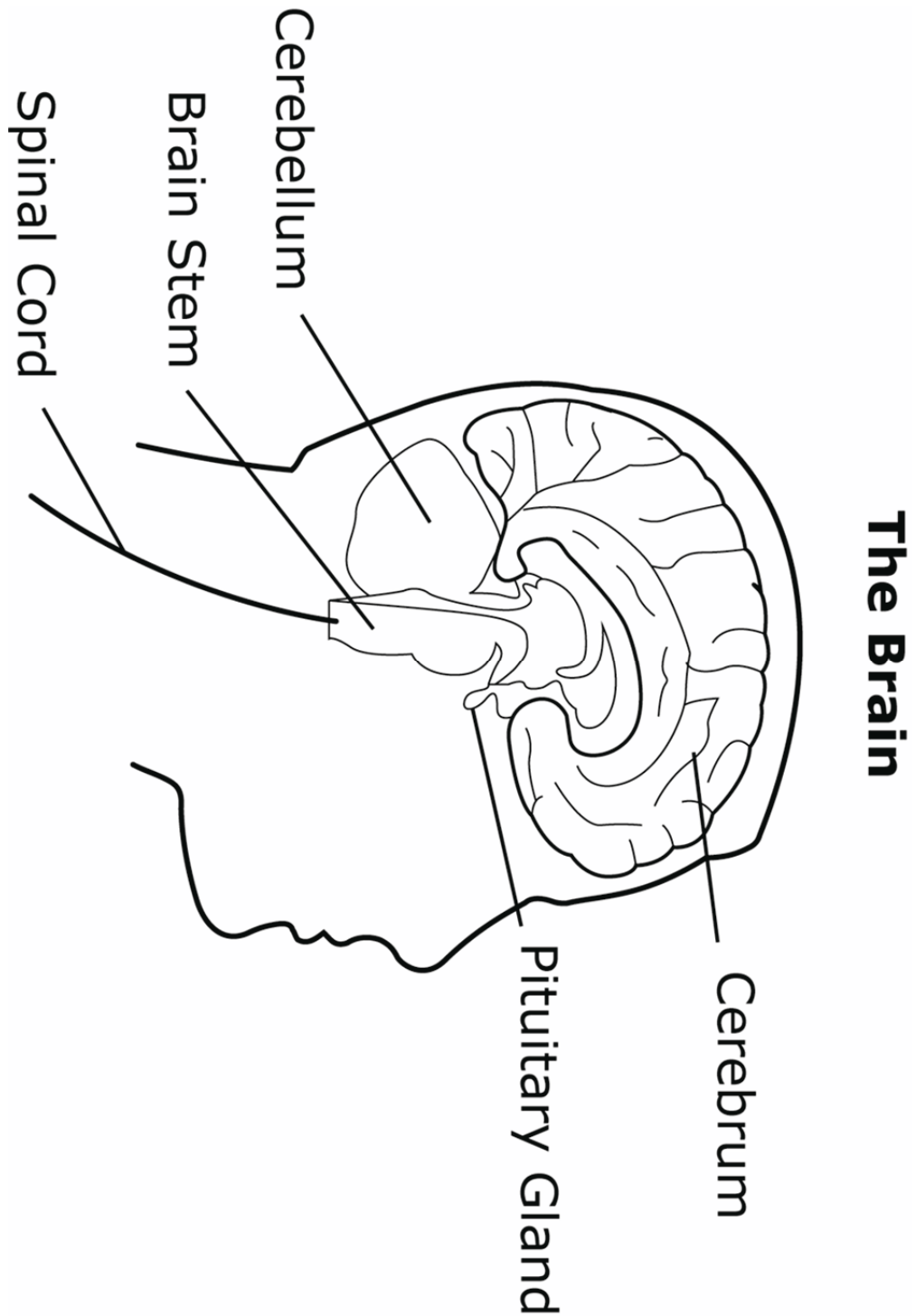
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Grade **8**

Ancillary Material

Figure 1



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Ancillary Material

Figure 1

Picture Description: The diagram shows that the brain takes up most of the space inside a person's head. The top section of the brain looks like a long tube that is all piled up. That part is labeled "Cerebrum." In the center of the brain there is another separate section that runs down to the bottom of the head. It connects to a cylinder shaped piece that is labeled "Brain Stem." There is a tiny piece that is connected to the center piece that is labeled "Pituitary Gland." There is another medium-sized section at the back that is labeled "Cerebellum." There is a line that runs down from the head into the neck that is labeled "Spinal Cord."